

(PCT Article 36 and Rule 70)

Date of submission of the demand	Date of completion of this report
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/011304

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-10 _____ as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the claims:
- nos. _____ as originally filed/furnished
- nos.* _____ as amended (together with any statement) under Article 19
- nos.* 1-17 _____ received by this Authority on 10.06.2005 with letter of 06.06.2005
- nos.* _____ received by this Authority on _____
- ☒ the drawings:
- sheets 1/1 _____ as originally filed/furnished
- sheets* _____ received by this Authority on _____
- sheets* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1.	Statement		
	Novelty (N)	Claims <u>1-16</u>	YES
		Claims <u>17</u>	NO
	Inventive step (IS)	Claims <u>10, 13, 14</u>	YES
		Claims <u>1-9, 11, 12, 15-17</u>	NO
	Industrial applicability (IA)	Claims <u>1-17</u>	YES
		Claims _____	NO
2.	Citations and explanations (Rule 70.7)		
	This report makes reference to the following documents:		
	D1: US-A-3 704 377 (LEHOVEC KURT), 28 November 1972 (1972-11-28)		
	D3: EP-A-0 807 982 (COMMISSARIAT ENERGIE ATOMIQUE), 19 November 1997 (1997-11-19)		
	D4: DE 195 18 303 A (KERNFORSCHUNGSANLAGE JUELICH), 21 November 1996 (1996-11-21)		
	1. Document D3 is regarded as the prior art closest to the subject matter of claim 1 and discloses:		
	<p>an optoelectronic component with a semiconductor chip having multiple radiation-sensitive zones (46, 50) for detecting electromagnetic radiation (4), and an optical element (diffraction grid (52)) for diffracting (column 2, lines 10-12) the electromagnetic radiation (4) in the radiation-sensitive zones (46, 50), the optical element being a diffractive element (column 2, lines 10-12; column 8, lines 10-30; column 10, lines 1-5; figures 5 and 7) having structures (1, p) in the order of magnitude ($p=1.8 \mu\text{m}$: column 10, line 46) of the wavelength of the electromagnetic radiation (4). The semiconductor chip has</p>		

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	<p>multiple radiation-sensitive zones (46, 50) sensitive to shorter wavelengths (zone (50) for 5 μm) arranged after the radiation-sensitive zones sensitive to longer wavelengths (zone (46) for 10 μm) in the direction of the incident radiation (4) (column 9, line 42 - column 10, line 51; figure 7).</p> <p>The subject matter of claim 1 therefore differs from the known component in that the optical element serves for focussing the electromagnetic radiation.</p> <p>A second difference which is not presented in claim 1 is that the diffractive element of the claimed component is arranged on the front side.</p> <p>However, D3 (see column 2, lines 4 and 5) explicitly mentions the possibility of arranging the diffraction grid on the front side of the component. Moreover, it is known that a diffractive element arranged in the radiation entry surface causes the electromagnetic radiation to be focussed (see, for example, D1: column 4, line 63 - column 5, line 6).</p> <p>Consequently, the solution proposed in claim 1 of the present application cannot be considered inventive (PCT Article 33(3)).</p> <p>2. The same reasoning also applies to claims 15 and 16. Document D3 further discloses a resin layer structuring step (column 8, lines 39-46). The subject matter of claims 15 and 16 therefore does not involve an inventive</p>

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	<p>step (PCT Article 33(3)).</p> <p>3. Document D4 discloses the use of a zone plate (40) (D4: figure 4) for focussing electromagnetic radiation (13; 23; 33) (column 4, lines 5-13) in multiple radiation-sensitive zones (12; 22; 32) (column 3, lines 60-64) of a radiation-detecting semiconductor chip (10).</p> <p>The subject matter of claim 17 is therefore not novel (PCT Article 33(2)).</p> <p>4. The subject matter of claims 2-9, 11 and 12 does not involve an inventive step for the following reasons:</p> <ul style="list-style-type: none">• claim 2: document D4 discloses the use of a zone plate (column 4, lines 5-13; figure 4) as diffractive element arranged on the rear side (D4: figure 3) in a configuration similar to that in figure 7 of document D3;• claims 3 and 4: according to D3, the diffractive element is integrated in the semiconductor chip (figure 7) and the radiation to be detected measures 5 μm, for example (column 10, line 48);• claim 5: although D3 relates to IR detectors, a person skilled in the art would consider modifying the component disclosed in D3 slightly in order to detect light in the visible spectrum range;• claim 6: see D3, column 10, lines 41-51;• claims 7 and 8: the optimum embodiment of the zone plate represents a conventional measure; see, for example D4, in which the smallest ring width amounts

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	<p>to 1.5 μm (column 5, lines 23-26);</p> <ul style="list-style-type: none">• claim 9: according to D3, the radiation-sensitive zones (46 and 50) are arranged precisely in focal planes; cf. the maximum intensity position mark in figure 7B, which coincides with the middle of the different wavelength zones in figure 7A;• claims 11 and 12: see D3, column 8, lines 39-46. <p>5. The combination of features contained in dependent claim 10 is neither known from nor suggested by the available prior art, since the component in figure 7 of D3 contains two instead of three radiation-sensitive zones for detecting IR radiation. Although a person skilled in the art would consider detecting visible light, he would not be prompted to detect the primary colours red, green and blue separately.</p> <p>6. The combination of features contained in dependent claims 13 and 14 is neither known from nor suggested by the available prior art, for the following reasons:</p> <p>Document D1 (column 4, lines 50-52) discloses a phase zone plate made of a transparent material and of a non-transparent material.</p> <p>Document D4 (column 5, lines 13-22) discloses a phase zone plate made of at least one absorbing or reflecting material.</p>